

BNL Ergonomics Bulletin

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Brought to you by the Safety and Health Services Division

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In this Issue (Part II of II):

- ***Standing and its Hazards1***
- ***Standing Workstations2***
 - ***Ways to Reduce Discomfort and Risk of Illness in a Standing Workstation.....2***
- ***Sit/Stand Workstations.....3***
- ***General Miscellaneous Tips..4***
- ***References.....4***

The previous bulletin covered sitting workstations and other office environmental factors that can affect your work and comfort such as lighting and office furniture. This issue will address standing and sit/stand workstations and offer suggestions on ways to reduce discomfort and prevent any possible health problems associated with these workstations.

Standing and its Hazards¹

Why do we stand? Well, we stand to cover larger areas, exert greater forces, and to promote blood circulation and postural changes. Many of us work in a standing position quite often and don't realize that it can cause health problems such as sore feet, swelling of the legs, varicose veins, general muscular fatigue, low back pain, and stiffness in the neck and shoulders. Sustaining our bodies in an upright position takes quite a bit of muscular effort which is unhealthy even while standing in a

static or still position. Standing in a static position decreases blood flow to the muscles, accelerates the onset of fatigue, and causes pain in the the leg, back and neck muscles. Another health problem that may arise from standing for a long time is the temporary immobilization or locking of the joints in the spine, hips, knees and feet. Locking of these joints can lead to rheumatic diseases due to degenerative damage to tendons and ligaments (these structures bind our muscles to our bones and our bone ends together respectively). Rheumatic diseases are characterized by inflammation or pain in muscles, joints, or fibrous tissue.

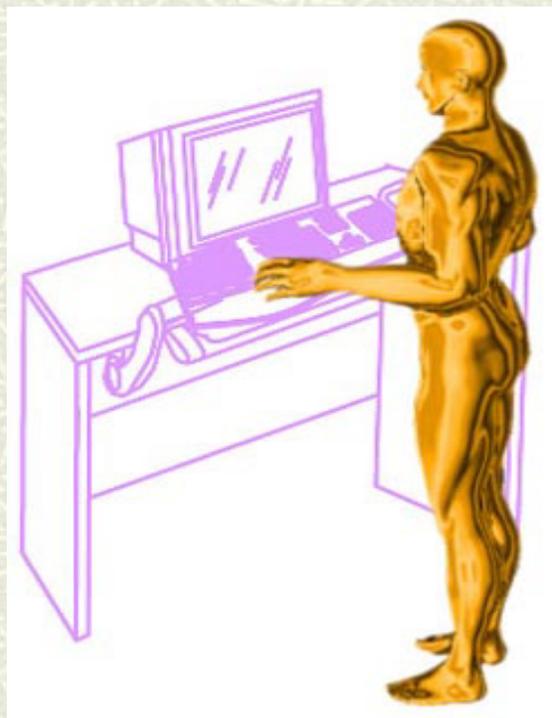


Fig. 1. Standing Computer Workstation¹



Standing Workstations

Standing workstations are very common in the workplace. Working on a lab bench while standing is considered a standing workstation, working on an engine lathe at a machine shop is considered a standing workstation, and Fig. 1 is another example of such a workstation. Some hazards or health problems associated with them are those formerly mentioned like fatigue, back problems, varicose veins, and swollen feet.

• To Reduce Discomfort and Risk of Illness in a Standing Workstation ...^{2,3}

To reduce discomfort and the risk for illness in a standing workstation you should do the following:

- Place objects that you use regularly within easy reach. You should not have to overextend or overreach.
- Keep your body close to your work area.
- Shift your body weight from one foot to another by using a foot rail or portable footrest to relieve some of the pressure on your back, and promote postural changes and proper blood circulation.

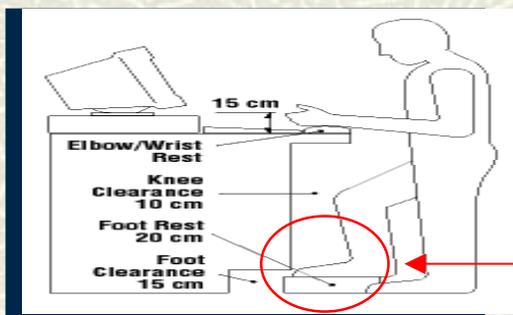


Fig. 2. Footrest to alleviate back pressure³

- Take periodic breaks and walk around and/or stretch. Do not stay in the same position for a long time.
- Avoid twisting. (Use your feet (pivot) to face the object/workstation instead of twisting.)
- Avoid reaching over the shoulders whenever possible.
- To reduce fatigue and stress do the following stretch exercise:²

While standing upright with feet slightly apart...

- Place the palms on your lower back.
- While keeping your chin down, focus your eyes on a target straight ahead.
- Using your hands to support your lower back, bend over backwards but make sure not to lock your knees.
- Hold this position for approximately five to ten seconds and return to starting position.
- Repeat this stretch exercise three to five times.

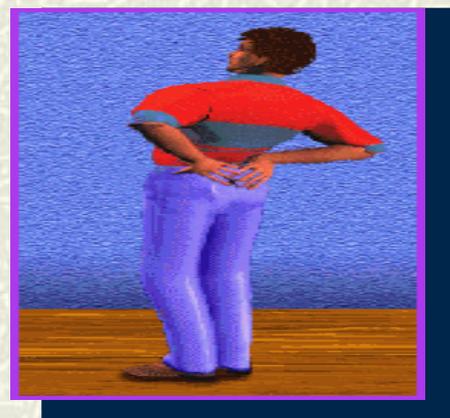


Fig. 3. Sample Stretch²



Ways to Reduce Discomfort and Risk of Illness in a Standing Workstation⁴ (cont.)...

- Maintain good posture by maintaining the natural curve of your back/spine. Your natural back curve is in the shape of an S. (Fig. 4)
- Avoid slouching forward or hyperextending.
- Keep your chin up with the head centered over the shoulders.
- Keep your feet slightly less than shoulder width apart.
- Keep your knees slightly bent.
- Tighten your stomach muscles.
- Wear comfortable shoes that provide good support especially if working on a hard surface.

Note: A rubber mat or anti-fatigue mat may be used to reduce/alleviate foot fatigue.



Fig. 4. Proper back curvature⁴

Sit/Stand Workstations^{4,5}

Some workstations allow you to sit or stand while performing your work. Such workstations are known as sit/stand workstations (Fig.5). One would probably think that alternating between sitting and standing would be enough. However, that is not totally correct. Like any other, this workstation is not without good practices to aid in discomfort alleviation.

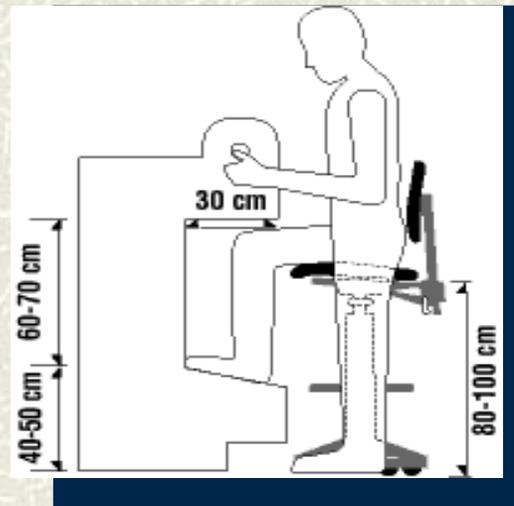


Fig. 5. Sit/Stand Workstation⁵

Do the following when adjusting your sit/stand workstation:

- Adjust the workstation to the proper height.*

* Note: Though different tasks require different work surface heights, it should properly fit your size and shape and provide support for task completion.

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Do the following when adjusting your sit/stand workstation (cont.):

- To avoid or minimize side-to-side motions, use a swivel chair with an adjustable seat height.
- Adjust the seat height 25-35 cm below your work surface.
- Make sure your chair has a footrest and that the height is approximately 40-50 cm.

Note: An example of a sit/stand chair is depicted in Fig. 6. Do the following when using one of these:

- Ensure that the seat has a minimum width of 40cm and that the padding on the chair is approximately 2-3 cm thick.
- Ensure that chair has a back support to protect against low back pain.
- Ensure that the seat covering is made of non-slip material (breathable fabric) so that you won't slide off the chair.

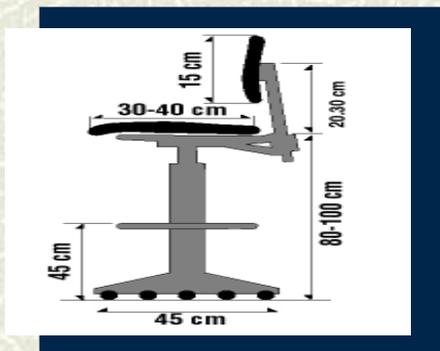


Fig. 6. Adjustable chair for sit/stand workstation⁵

General Miscellaneous Tips:

* REMEMBER:

- Do not stay in a static/still position for long periods.
- Take periodic breaks, stretch, and walk around.
- Maintain maintain a neutral posture.
- Avoid awkward postures.
- Avoid repetitive motions.
- Avoid excessive forces.

References

1. <http://www.3m.com/cws/selfhelp/guidelns.html>
2. <http://www.mmm.com/cws/selfhelp/strback.html>
3. http://www.ccohs.ca/oshanswers/ergonomics/standing/standing_basic.html
4. <http://www.spine-health.com/topics/cd/ergo/ergo03.html>
5. http://www.ccohs.ca/oshanswers/ergonomics/standing/sit_stand.html

If you have any questions or concerns about any of the ergonomics issues covered on this bulletin or those covered in previous ones, you may contact John Peters at Ext. 7475.

**On the next issue
Your Back**